

Office **SM6-262**

Remarks/Arguments begin on page 5 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in this application.

Listing of the Claims:

Claims 1-2 (previously cancelled)

Claim 3 (previously amended): The ion source (50) of claim 4, wherein said control mechanism comprises a heating element (80) for heating the heating medium (70), a pump (55) for circulating said heating medium, at least one thermocouple (92) for providing temperature feedback from said heating medium (70), and a controller (56) responsive to said temperature feedback to output a first control signal (94) to said heating element.

Claim 4 (currently amended): An ion source (50) for an ion implanter, comprising:

(i) a sublimator (52) including a crucible having crucible walls (64) defining a cavity (66) for receiving a mass of source material (68) in a solid state to be sublimated and for sublimating the source material into a vapor state;

(ii) a gas injector (104) for injecting gas into the mass of source material in said cavity (66) for improving heat transfer between said crucible walls and the source material;

(iii) an ionization chamber (58) for ionizing the sublimated source material, said ionization chamber located remotely from said sublimator;

(iv) a feed tube (62) for connecting said sublimator (52) to said ionization

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chamber (58); and

(v) a heating medium (70) for heating at least a portion of said sublimator (52) and said feed tube (62), and a control mechanism for controlling the temperature of said heating medium (70),

wherein said gas is selected from the group consisting of helium and hydrogen.

Claim 5 (previously canceled)

Claim 6 (previously amended): The ion source (50) of claim 4, wherein said source material is a molecular solid having a vapor pressure of between 10^{-2} Torr and 10^3 Torr and a sublimation temperature of between 20° C and 150° C.

Claim 7 (original): The ion source (50) of claim 6, wherein said source material is decaborane.

Claim 8 (original): The ion source (50) of claim 7, wherein said gas improves the heat transferability between walls (64) of the sublimator (52) and the source material (68).

Claims 9-10 (previously canceled)

Claim 11 (previously amended): The vaporizer of claim 12, wherein said control mechanism comprises a heating element (80) for heating the heating medium (70), a pump (55) for circulating said heating medium, at least one thermocouple (92) for providing temperature feedback from said heating medium (70), and a controller (56) responsive to said temperature feedback to output a first control signal (84) to said heating element.

Claim 12 (currently amended): A vaporizer for an ion source (50), comprising:

- (i) a crucible (52) including a crucible having crucible walls (64) defining a cavity (66) for receiving a mass of source material

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- (68) in a solid state to be vaporized and for vaporizing the source material;
- (ii) a gas injector (104) for injecting gas into the mass of source material in said cavity (66) for improving heat transfer between the source material and said crucible walls;
- (iii) a feed tube (62) for connecting said vaporizer (52) to a remotely located ionization chamber in which vaporized source material may be ionized;
- (iv) a heating medium (70) for heating at least a portion of said vaporizer (52) and said feed tube (62); and
- (v) [the vaporizer claim 9, further comprising] a control mechanism for controlling the temperature of said heating medium (70), wherein said gas is selected from the group consisting of helium and hydrogen.

Claim 13 (previously canceled)

Claim 14 (previously amended): The vaporizer of claim 12, wherein said source material is a molecular solid having a vapor pressure of between 10^{-2} Torr and 10^3 Torr and a sublimation temperature of between 20° C and 1500° C.

Claim 15 (original): The vaporizer of claim 14, wherein said source material is decaborane.

Claim 16 (original): The vaporizer of claim 15, wherein said gas improves the heat transferability between walls (64) of the crucible (52) and the source material (68)